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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,790	04/11/2001	Michael J. Lodes	210121.512	1956

500 7590 12/10/2002

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EXAMINER

WHISENANT, ETHAN C

ART UNIT PAPER NUMBER

1634

DATE MAILED: 12/10/2002

12

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/833,790

Applicant(s)

LODES ET AL.

Examiner

Ethan Whisenant, Ph.D.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 2,5-7,9,10,12,13 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,8,11 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. Applicant's election of Group I (Claims 1, 3-4, 8 11 and 14 & SEQ ID NO: 365) in the response filed 18 SEP 02 (i.e. paper Nos. 9-11) is acknowledged. Accordingly, Claims 2, 5-7, 9-10, 12-13 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. It is noted that the applicant did not distinctly and specifically point out any supposed errors in the restriction requirement, therefore the election has been treated as an election without traverse (MPEP § 818.03(a)). The restriction requirement has been reconsidered, is deemed proper and is therefore, herein made **FINAL**. An action on **Claim(s) 1, 3-4, 8, 11 and 14 as they relate to SEQ ID NO: 365** follows.

SEQUENCE RULES

2. This application complies with the sequence rules and the sequences have been entered by the Scientific and Technical Information Center.

35 USC § 101

3. 35 U.S.C. § 101 reads as follows:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title".

Claim Rejections - 35 USC § 101

- 4.** Claim(s) 1, 3-4, 8 11 and 14 is/are rejected under 35 U.S.C. § 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility.

The claimed cDNA compound is not supported by a specific asserted utility because the use of SEQ ID NO: 365 or a fragment thereof is generally applicable to any nucleic acid and therefore is not particular to the nucleic acid being claimed. Further, the claimed cDNA compound is not supported by a substantial utility because the specification only supports the use of the cDNA for making the corresponding protein. In this case the protein set forth in SEQ ID NO: 366. Once the protein is obtained, the protein would be used in research to functionally characterize the protein. A starting material that can only be used to produce a final product does not have a substantial asserted utility in those instances where the final product is not supported by a specific and substantial utility. In the instant case the protein that is to be produced as a final product resulting from processes involving the claimed cDNA does not have an asserted or identified specific and substantial utility. The research contemplated by applicants to characterize the potential protein product, especially their biological activities, does not constitute a specific and substantial utility. Identifying and studying the properties of the protein itself or the mechanisms in which the protein is involved does not define a "real world" context of use. Note, because the claimed invention is not supported by a specific and substantial asserted utility for the reasons set forth above, credibility has not been assessed. Neither the specification as filed nor any art of record discloses or suggests any property or activity for the cDNA compound such that another non-asserted utility would be well established for the compound

35 USC § 112 - 1ST PARAGRAPH

- 5.** The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

CLAIM REJECTIONS under 35 USC § 112- 1ST PARAGRAPH

- 6.** Claim(s) 1, 3-4, 8,11 and 14 is/are rejected under 35 U.S.C. 112, first paragraph.

Specifically, since the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility for the reason(s) set forth above, one skilled in the art would not know how to use the claimed invention without undue experimentation.

35 USC § 112- 2ND PARAGRAPH

- 7.** The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

CLAIM REJECTIONS under 35 USC § 112- 2ND PARAGRAPH

- 8.** Claim(s) 1, 3-4, 8, 11 and 14 is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim(s) 1, 3-4, 8, 11 and 14 recite limitations that have been withdrawn from consideration as the result of the restriction/election requirement. Please correct.

Claim(s) 1 is/are indefinite in that in the preamble the claim recites a "polynucleotide comprising" however in section (c) the claim recites "sequences consisting of" These are contradictory in that one (i.e. a "polynucleotide comprising") is open language while the other (i.e. "sequences consisting of") is closed language. As a result the scope of the claimed invention cannot be determined. Please clarify.

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35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that may form the basis for rejections set forth in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) The invention was described in --

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a)

Claim Rejections under 35 USC § 102

10. Claim(s) 1 is/are rejected under 35 U.S.C. 102(a) as being anticipated by Kikuno et al. (1999).

Claim 1 is drawn to an isolated polynucleotide comprising a sequence selected from a defined group which includes a polynucleotide sequence provided in SEQ ID NO : 365 or the complement of SEQ ID NO: 365 or a sequence that will hybridize to SEQ ID NO: 365 under moderately stringent conditions or a sequence consisting of at least 20 contiguous residues of a sequence provided in SEQ ID NO: 365 or a sequence which has at least 75% identity with SEQ ID NO: 365 or a sequence which has at least 90% identity with SEQ ID NO: 365 or a degenerate variant of SEQ ID NO: 365.

Kikuno et al. teach an isolated polynucleotide comprising (i.e. provided in) SEQ ID NO : 365. See the attached marked Kikuno et al./ SEQ ID NO: 365. Also note the attached marked Emerson et al./ SEQ ID NO: 365. Emerson et al. is not prior art, but it could become prior art if a corresponding US patent issues which claims priority to the US provisional application cited on the front of WO0121640 A1. The sequence taught by Kikuno et al. consists of at least 20 contiguous residues of a sequence provided in SEQ ID NO: 365. Note that because Kikuno et al. teach SEQ ID NO: 365 they necessarily (i.e. inherently) teach the complement of SEQ ID NO: 365 (i.e. a sequence that will hybridize to SEQ ID NO: 365 under moderately stringent conditions)

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Also, note that the sequence of Kikuno et al. has a sequence which has at least 75% identity with SEQ ID NO: 365 and has at least 90% identity with SEQ ID NO: 365. Finally, note that Kikuno et al. teach one variant (i.e. degenerate variant) of SEQ ID NO: 365.

11. Claim(s) 1 and 8 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Sommer et al. (1989).

Claim 1 is drawn to an isolated polynucleotide comprising a sequence selected from a defined group which includes a polynucleotide sequence that will hybridize with SEQ ID NO: 365 under moderately stringent conditions.

Claim 8 is drawn to an oligonucleotide that hybridizes to SEQ ID NO: 365 under moderately stringent conditions.

Sommer et al. teach an isolated polynucleotide (i.e. the first oligo listed in Table 1) which will hybridize with SEQ ID NO: 365 under moderately stringent conditions. Admittedly, the oligo taught by Sommer et al. will not hybridize throughout its entire length with SEQ ID NO: 365 but it will hybridize enough to prime amplification under moderately stringent conditions, therefore it meets all of the limitations of Claim 1 part (d) and all of the limitations of Claim 8. See for example, the sequence of SEQ ID NO: 365 at nucleotide 1359-1361 which reads TAG. This is the inverse complement of the 3' end of the first oligo listed in Table 1. Note that Sommer teaches the minimal homology requirements for PCR primers (i.e. 17-20mers need at least 3 complementary nucleotides at their 3' ends for successful priming). One possible way to overcome this rejection is to amend the claim(s) to make it clear that the sequences claimed in Claim 1, step(d), and Claim 8 hybridize throughout their entire lengths to SEQ ID NO: 365.

35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

CLAIM REJECTIONS UNDER 35 USC § 103

14. Claim(s) 14 is/are rejected under 35 U.S.C. 102(b) as being anticipated by Sommer et al. (1989) as applied against Claim 8 above and further in view of the Stratagene Catalog (1988).

Claim 14 is drawn to a kit comprising at least one oligo according to Claim 8.

Sommer et al. teaches an oligo which meets all of the limitations of Claim 8. Sommer et al. does not teach a kit. However, as evidenced by the Stratagene Catalog teaching, it was well known at the time of the invention to place the reagents needed to perform a nucleic acid based assay into a kit format. Therefore, absent an unexpected result, it would have been *prima facie* obvious to the ordinary artisan at the time of the invention to modify the teachings of Sommer et al. with the teachings of the Stratagene Catalog wherein the reagents necessary to perform the method suggested by Sommer et al. are placed into a kit format. The ordinary artisan would have been motivated to make this modification in order to take advantage of the savings and efficiency afforded by kits.

CONCLUSION

15. Claim(s) 1, 3-4, 8, 11 and 14 is/are rejected and/or objected to for the reason(s) set forth above.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ethan Whisenant, Ph.D. whose telephone number is (703) 308-6567. The examiner can normally be reached Monday-Friday from 8:30AM -5:30PM EST or any time via voice mail. If repeated

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attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, W. Gary Jones, can be reached at (703) 308-1152.

The fax number for this Examiner is (703) 746-8465. Before faxing any papers please inform the examiner to avoid lost papers. Please note that the faxing of papers must conform with the Notice to Comply published in the Official Gazette, 1096 OG 30 (November 15, 1989). Any inquiry of a general nature or relating to the status of this application should be directed to the group receptionist whose telephone number is (703) 308-0196.



Ethan Whisenant, Ph.D.
Primary Examiner

Kikuno et al./SEQ ID NO: 365

RESULT 3

AB029000

LOCUS AB029000 4834 bp mRNA linear PRI 04-AUG-1999

DEFINITION Homo sapiens mRNA for KIAA1077 protein, partial cds.

ACCESSION AB029000

VERSION AB029000.1 GI:5689490

KEYWORDS

SOURCE Homo sapiens brain cDNA to mRNA, clone_lib:pBluescriptII SK plus clone:hj06803.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi; Mammalia; Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (sites)

AUTHORS Kikuno,R., Nagase,T., Ishikawa,K., Hirose,M., Miyajima,N., Tanaka,A., Kotani,H., Nomura,N. and Ohara,O.

TITLE Prediction of the coding sequences of unidentified human genes. XIV. The complete sequences of 100 new cDNA clones from brain which code for large proteins in vitro

JOURNAL DNA Res. 6 (3), 197-205 (1999)

MEDLINE 99397452

REFERENCE 2 (bases 1 to 4834)

AUTHORS Ohara,O., Nagase,T. and Kikuno,R.

TITLE Direct Submission

JOURNAL Submitted (17-JUN-1999) Osamu Ohara, Kazusa DNA Research Institute, Laboratory of DNA Technology; Yana 1532-3, Kisarazu, Chiba 292-0812, Japan (E-mail:cdnainfo@kazusa.or.jp, Tel:+81-438-52-3913, Fax:+81-438-52-3914)

FEATURES Location/Qualifiers

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Qy	2701	AATGGAGATGGCCTCTGCTGACTCAGATGAAGACCCAAGGCATAAGGTTGGGAAAACACC	2760
Db	2701	AATGGAGATGGCCTCTGCTGACTCAGATGAAGACCCAAGGCATAAGGTTGGGAAAACACC	2760
Qy	2761	TCATTTGACCTTGCCAGCTGACCTTCAAACCCTGCATTTGAACCGACCAACATTAAGTCC	2820
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Qy	3001	CAGGCACCCGAAAGAACTTCCCCAGTATGGTGGTCTCTGAAAGGACATTTTTGAAGATCA	3060
Db	3001	CAGGCACCCGAAAGAACTTCCCCAGTATGGTGGTCTCTGAAAGGACATTTTTGAAGATCA	3060
Qy	3061	ACTATATCTTCTGTGCATTCCGATGGAATTTAGTTTCATCAGATGTTACCATGGCCAC	3120
Db	3061	ACTATATCTTCTGTGCATTCCGATGGAATTTAGTTTCATCAGATGTTACCATGGCCAC	3120
Qy	3121	CGCAGAACACCGAAGTAATTCAGCATAGCGGGGAAGATGTTGACCAAGGTGGAGAAGAA	3180
Db	3121	CGCAGAACACCGAAGTAATTCAGCATAGCGGGGAAGATGTTGACCAAGGTGGAGAAGAA	3180
Qy	3181	TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCCTCTTCACTCTCCTCTGA	3240
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Qy	3301	AACTAATAAAGGTAATCACAGCCACCAACATTCCAAGCTACCCTGGGTACCTTTGTGCAG	3360
Db	3301	AACTAATAAAGGTAATCACAGCCACCAACATTCCAAGCTACCCTGGGTACCTTTGTGCAG	3360
Qy	3361	TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATTTA	3420
Db	3361	TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATTTA	3420
Qy	3421	CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGGATATTTGGGTTGGCTTGGTTTTGATTTT	3480
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Qy	3481	TTGCTTGTTTGTGTTTGTGTTTGTACTAAAACAGTATTATCTTTTGAATATCGTAGGGACATA	3540
Db	3481	TTGCTTGTTTGTGTTTGTGTTTGTACTAAAACAGTATTATCTTTTGAATATCGTAGGGACATA	3540

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Qy 4321 GCTTTTGAAAATCTGTATTCTTGAAAATATCCTTGTTGTGTATTAGGTTTTTAAATACCA 4380
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 Db 4801 CAATATTTCTTCAAATAAAAGGTGTTTAACTTT 4834
 |||||

Emerson et al./ SEQ ID NO: 365

RESULT 2

AAD03774

ID AAD03774 standard; cDNA; 4834 BP.

XX

AC AAD03774;

XX

DT 19-JUN-2001 (first entry)

XX

DE Human sulfatase (HSulf-1) AB029000 cDNA.

XX

KW Human; sulfatase; Sulf-1; Sulf-2; cytostatic; virucide; antiinflammatory;
KW degenerative disease; neural; renal; skeletal muscle; viral infection;
KW metastasis; inflammation; cancer; EST; Expressed Sequence Tag; therapy;
KW ss.

XX

OS Homo sapiens.

XX

FH Key

Location/Qualifiers

FT CDS

1..4833

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 FT does not include start and stop codons"
 FT /partial
 XX

PN WO200121640-A1.

XX
PD 29-MAR-2001.

XX
PF 22-SEP-2000; 2000WO-US26124.

XX
PR 23-SEP-1999; 99US-0155738.

XX
PA (UYPE-) UNIV PENNSYLVANIA.

PA (ROYA-) ROYAL VETERINARY COLLEGE.

XX
PI Emerson CP, Dhoot GK;

XX
DR WPI; 2001-266062/27.

DR P-PSDB; AAE00438.

XX
PT Novel Sulf-1 or Sulf-2 (members of subfamily of sulfatases) polypeptide
 PT useful for treating musculoskeletal, neural or renal degenerative
 PT disorder, and for inhibiting viral infection of cells -

XX
PS Claim 2; Page 40-42; 59pp; English.

CC The present cDNA sequence encodes human sulfatase (HSulf-1) which is
 CC obtained from EST (Expressed Sequence Tag) AB029000.
 CC The invention relates to Sulf-1 and Sulf-2 proteins and their
 CC corresponding cDNA molecules which are the members of subfamily of
 CC sulfatases. These sulfatase proteins are expressed in neural and muscle
 CC lineages in various species. Sulfatase proteins are useful for modifying
 CC growth properties of cells, preferably cancer cells, useful in the
 CC treatment of cancer and in the inhibition of metastases. Sulf-1 and
 CC Sulf-2 are useful in developing cells for transplant in the treatment of
 CC skeletomuscular degenerative diseases, neurodegenerative diseases, renal
 CC degenerative diseases and in initiation growth of healthy cells and to
 CC heal diseased cells in these disorders. Sulfatases are also useful for
 CC inhibiting infection of cells by viruses which utilise sulfated heparin
 CC proteoglycans for entry into cells, and for modulating recruitment of
 CC lymphocytes by cells to sites of inflammation. A functional embryonic

CC technique is useful to functionally characterise members of Sulf-1 and
CC Sulf-2 sulfatase gene subfamily, which is efficient and economical.

XX

SQ Sequence 4834 BP; 1498 A; 992 C; 1042 G; 1302 T; 0 other;

Query Match 100.0%; Score 4834; DB 22; Length 4834;
Best Local Similarity 100.0%; Pred. No. 0;
Matches 4834; Conservative 0; Mismatches 0; Indels 0; Gaps 0;

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Db      1 GATGTGGAGCTGGGGTCCCTGCAAGTCATGAACAAAACGAGAAAGATTATGGAACATGGG 60

Qy     61 GGGGCCACCTTCATCAATGCCTTTGTGACTACACCCATGTGCTGCCCGTCACGGTCCTCC 120
      |||
Db     61 GGGGCCACCTTCATCAATGCCTTTGTGACTACACCCATGTGCTGCCCGTCACGGTCCTCC 120

Qy    121 ATGCTCACCGGGAAGTATGTGCACAATCACAATGTCTACACCAACAACGAGAACTGCTCT 180
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Db    121 ATGCTCACCGGGAAGTATGTGCACAATCACAATGTCTACACCAACAACGAGAACTGCTCT 180

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Db    181 TCCCCCTCGTGGCAGGCCATGCATGAGCCTCGGACTTTTGCTGTATATCTTAACAACACT 240

Qy    241 GGCTACAGAACAGCCTTTTTTGGAAAATACCTCAATGAATATAATGGCAGCTACATCCCC 300
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Db    361 TGTCGCAATGGCATCAAAGAAAAGCATGGATTTGATTATGCAAAGGACTACTTCACAGAC 420

Qy    421 TTAATCACTAACGAGAGCATTAACTTCAAAATGTCTAAGAGAATGTATCCCCATAGG 480
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Db    421 TTAATCACTAACGAGAGCATTAACTTCAAAATGTCTAAGAGAATGTATCCCCATAGG 480

Qy    481 CCCGTTATGATGGTGATCAGCCACGCTGCGCCCCACGGCCCCGAGGACTCAGCCCCACAG 540
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Db    481 CCCGTTATGATGGTGATCAGCCACGCTGCGCCCCACGGCCCCGAGGACTCAGCCCCACAG 540

Qy    541 TTTTCTAAACTGTACCCCAATGCTTCCCAACACATAACTCCTAGTTATAACTATGCACCA 600
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Db    541 TTTTCTAAACTGTACCCCAATGCTTCCCAACACATAACTCCTAGTTATAACTATGCACCA 600

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Qy    661 TTTACAAACATTCTACAGCGCAAAGGCTCCAGACTTTGATGTGAGTGATGATTCTGTG 720
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Db    721 GAGAGGCTGTATAACATGCTCGTGAGACGGGGGAGCTGGAGAATACTTACATCATTTAC 780
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Db	1261	CACAAGTGTAAGGACCCAGTGACCTGCTCACAGTCCGGCAGAGCACGCGGAACCTCTAC	1320
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Db	1321	GCTCGCGGCTTCCATGACAAAGACAAAGAGTGCAGTTGTAGGGAGTCTGGTTACCGTGCC	1380
Qy	1381	AGCAGAAGCCAAAGAAAGAGTCAACGGCAATTCTTGAGAAACCAGGGGACTCCAAAGTAC	1440
Db	1381	AGCAGAAGCCAAAGAAAGAGTCAACGGCAATTCTTGAGAAACCAGGGGACTCCAAAGTAC	1440
Qy	1441	AAGCCAGATTTGTCCATACTCGGCAGACACGTTCTTGTCCGTCGAATTTGAAGGTGAA	1500
Db	1441	AAGCCAGATTTGTCCATACTCGGCAGACACGTTCTTGTCCGTCGAATTTGAAGGTGAA	1500
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Db	1621	AACAGGGGCAGGATGCTGGCAGATAGCAGCAACGCCGTGGGCCACCTACCACTGTCCGA	1680

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 Db 1801 CAAGATAAAATTAAGAATTTAAGAGAAGTGAGAGGACATCTGAAGAGAAGGAAGCCTGAG 1860
 |||||
 Qy 1861 GAATGTAGCTGCAGTAAACAAAGCTATTACAATAAAGAGAAAGGTGTAAAAAAGCAAGAG 1920
 |||||
 Db 1861 GAATGTAGCTGCAGTAAACAAAGCTATTACAATAAAGAGAAAGGTGTAAAAAAGCAAGAG 1920
 |||||
 Qy 1921 AAATTAAAGAGCCATCTTCACCCATTCAAGGAGGCTGCTCAGGAAGTAGATAGCAAAC'TG 1980
 |||||
 Db 1921 AAATTAAAGAGCCATCTTCACCCATTCAAGGAGGCTGCTCAGGAAGTAGATAGCAAAC'TG 1980
 |||||
 Qy 1981 CAACTTTTCAAGGAGAACAACCGTAGGAGGAAGAAGGAGAGGAAGGAGAAGAGACGGCAG 2040
 |||||
 Db 1981 CAACTTTTCAAGGAGAACAACCGTAGGAGGAAGAAGGAGAGGAAGGAGAAGAGACGGCAG 2040
 |||||
 Qy 2041 AGGAAGGGGGAAGAGTGCAGCCTGCCTGGCCTCACTTGCTTCACGCATGACAACAACCAC 2100
 |||||
 Db 2041 AGGAAGGGGGAAGAGTGCAGCCTGCCTGGCCTCACTTGCTTCACGCATGACAACAACCAC 2100
 |||||
 Qy 2101 TGGCAGACAGCCCCGTTCTGGAACCTGGGATCTTTCTGTGCTTGACAGAGTTCTAACAAT 2160
 |||||
 Db 2101 TGGCAGACAGCCCCGTTCTGGAACCTGGGATCTTTCTGTGCTTGACAGAGTTCTAACAAT 2160
 |||||
 Qy 2161 AACACCTACTGGTGTTTTCGTACAGTTAATGAGACGCATAATTTTCTTTTCTGTGAGTTT 2220
 |||||
 Db 2161 AACACCTACTGGTGTTTTCGTACAGTTAATGAGACGCATAATTTTCTTTTCTGTGAGTTT 2220
 |||||
 Qy 2221 GCTACTGGCTTTTTTGAGTATTTTGATATGAATACAGATCCTTATCAGCTCACAATAACA 2280
 |||||
 Db 2221 GCTACTGGCTTTTTTGAGTATTTTGATATGAATACAGATCCTTATCAGCTCACAATAACA 2280
 |||||
 Qy 2281 GTGCACACGGTAGAACGAGGCATTTTGAATCAGCTACACGTACAATAATGGAGCTCAGA 2340
 |||||
 Db 2281 GTGCACACGGTAGAACGAGGCATTTTGAATCAGCTACACGTACAATAATGGAGCTCAGA 2340
 |||||
 Qy 2341 AGCTGTCAAGGATATAAGCAGTGCAACCCAAGACCTAAGAATCTTGATGTTGGAAATAAA 2400
 |||||
 Db 2341 AGCTGTCAAGGATATAAGCAGTGCAACCCAAGACCTAAGAATCTTGATGTTGGAAATAAA 2400
 |||||
 Qy 2401 GATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGGATGGATGGGAAGGTTAATCA 2460
 |||||
 Db 2401 GATGGAGGAAGCTATGACCTACACAGAGGACAGTTATGGGATGGATGGGAAGGTTAATCA 2460
 |||||
 Qy 2461 GCCCCGTCTCACTGCAGACATCAACTGGCAAGGCCTAGAGGAGCTACACAGTGTGAATGA 2520
 |||||
 Db 2461 GCCCCGTCTCACTGCAGACATCAACTGGCAAGGCCTAGAGGAGCTACACAGTGTGAATGA 2520
 |||||
 Qy 2521 AAACATCTATGAGTACAGACAAAAC'TACAGACTTAGTCTGGTGGACTGGACTAATTACTT 2580
 |||||
 Db 2521 AAACATCTATGAGTACAGACAAAAC'TACAGACTTAGTCTGGTGGACTGGACTAATTACTT 2580
 |||||

Qy 2581 GAAGGATTTAGATAGAGTATTTGCACTGCTGAAGAGTCACTATGAGCAAAATAAAACAAA 2640
 |||||
 Db 2581 GAAGGATTTAGATAGAGTATTTGCACTGCTGAAGAGTCACTATGAGCAAAATAAAACAAA 2640
 |||||

Qy 2641 TAAGACTCAAAGTCTCAAAGTGACGGGTTCTTGTTGTCTCTGCTGAGCACGCTGTGTC 2700
 |||||
 Db 2641 TAAGACTCAAAGTCTCAAAGTGACGGGTTCTTGTTGTCTCTGCTGAGCACGCTGTGTC 2700
 |||||

Qy 2701 AATGGAGATGGCCTCTGCTGACTCAGATGAAGACCCAAGGCATAAGGTTGGGAAAACACC 2760
 |||||
 Db 2701 AATGGAGATGGCCTCTGCTGACTCAGATGAAGACCCAAGGCATAAGGTTGGGAAAACACC 2760
 |||||

Qy 2761 TCATTTGACCTTGCCAGCTGACCTTCAAACCTGCATTGAACCGACCAACATTAAGTCC 2820
 |||||
 Db 2761 TCATTTGACCTTGCCAGCTGACCTTCAAACCTGCATTGAACCGACCAACATTAAGTCC 2820
 |||||

Qy 2821 AGAGAGTAAACTTGAATGGAATAACGACATTCCAGAAGTTAATCATTTGAATTCTGAACA 2880
 |||||
 Db 2821 AGAGAGTAAACTTGAATGGAATAACGACATTCCAGAAGTTAATCATTTGAATTCTGAACA 2880
 |||||

Qy 2881 CTGGAGAAAAACCGAAAAATGGACGGGGCATGAAGAGACTAATCATCTGGAAACCGATTT 2940
 |||||
 Db 2881 CTGGAGAAAAACCGAAAAATGGACGGGGCATGAAGAGACTAATCATCTGGAAACCGATTT 2940
 |||||

Qy 2941 CAGTGGCGATGGCATGACAGAGCTAGAGCTCGGGCCAGCCCCAGGCTGCAGCCCATTTCG 3000
 |||||
 Db 2941 CAGTGGCGATGGCATGACAGAGCTAGAGCTCGGGCCAGCCCCAGGCTGCAGCCCATTTCG 3000
 |||||

Qy 3001 CAGGCACCCGAAAGAACTTCCCCAGTATGGTGGTCTCTGGAAAGGACATTTTTGAAGATCA 3060
 |||||
 Db 3001 CAGGCACCCGAAAGAACTTCCCCAGTATGGTGGTCTCTGGAAAGGACATTTTTGAAGATCA 3060
 |||||

Qy 3061 ACTATATCTTCCTGTGCATTCCGATGGAATTTTCAGTTCATCAGATGTTACCATGGCCAC 3120
 |||||
 Db 3061 ACTATATCTTCCTGTGCATTCCGATGGAATTTTCAGTTCATCAGATGTTACCATGGCCAC 3120
 |||||

Qy 3121 CGCAGAACACCGAAGTAATTCCAGCATAGCGGGGAAGATGTTGACCAAGGTGGAGAAGAA 3180
 |||||
 Db 3121 CGCAGAACACCGAAGTAATTCCAGCATAGCGGGGAAGATGTTGACCAAGGTGGAGAAGAA 3180
 |||||

Qy 3181 TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCCTCTTCACTCTCCTCTGA 3240
 |||||
 Db 3181 TCACGAAAAGGAGAAGTCACAGCACCTAGAAGGCAGCGCCTCCTCTTCACTCTCCTCTGA 3240
 |||||

Qy 3241 TTAGATGAAACTGTTACCTTACCCTAAACACAGTATTTCTTTTAACTTTTTTATTTGTA 3300
 |||||
 Db 3241 TTAGATGAAACTGTTACCTTACCCTAAACACAGTATTTCTTTTAACTTTTTTATTTGTA 3300
 |||||

Qy 3301 AACTAATAAAGGTAATCACAGCCACCAACATTCCAAGCTACCCTGGGTACCTTTGTGCAG 3360
 |||||
 Db 3301 AACTAATAAAGGTAATCACAGCCACCAACATTCCAAGCTACCCTGGGTACCTTTGTGCAG 3360
 |||||

Qy 3361 TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATTTA 3420
 |||||
 Db 3361 TAGAAGCTAGTGAGCATGTGAGCAAGCGGTGTGCACACGGAGACTCATCGTTATAATTTA 3420
 |||||

Qy 3421 CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGGATATTTGGGTTGGCTTGGTTTTGATTTT 3480
 |||||
 Db 3421 CTATCTGCCAAGAGTAGAAAGAAAGGCTGGGGATATTTGGGTTGGCTTGGTTTTGATTTT 3480
 |||||

Qy	3481	TTGCTTGTGTTTGTGTTTGTGTTTGTACTAAAACAGTATTATCTTTTGAATATCGTAGGGACATA	3540
Db	3481	TTGCTTGTGTTTGTGTTTGTGTTTGTACTAAAACAGTATTATCTTTTGAATATCGTAGGGACATA	3540
Qy	3541	AGTATATACATGTTATCCAATCAAGATGGCTAGAATGGTGCCTTTCTGAGTGTCTAAAAC	3600
Db	3541	AGTATATACATGTTATCCAATCAAGATGGCTAGAATGGTGCCTTTCTGAGTGTCTAAAAC	3600
Qy	3601	TTGACACCCCTGGTAAATCTTTCAACACACTTCCACTGCCTGCGTAATGAAGTTTTGATT	3660
Db	3601	TTGACACCCCTGGTAAATCTTTCAACACACTTCCACTGCCTGCGTAATGAAGTTTTGATT	3660
Qy	3661	CATTTTAAACCACTGGAATTTTTCAATGCCGTCATTTTCAGTTAGATGATTTTGCACCTTT	3720
Db	3661	CATTTTAAACCACTGGAATTTTTCAATGCCGTCATTTTCAGTTAGATGATTTTGCACCTTT	3720
Qy	3721	GAGATTA AAAATGCCATGTCTATTTGATTAGTCTTATTTTTTTATTTTTACAGGCTTATCA	3780
Db	3721	GAGATTA AAAATGCCATGTCTATTTGATTAGTCTTATTTTTTTATTTTTACAGGCTTATCA	3780
Qy	3781	GTCTCACTGTTGGCTGTGTCATTGTGACAAAGTCAAATAAACCCCAAGGACGACACACAGT	3840
Db	3781	GTCTCACTGTTGGCTGTGTCATTGTGACAAAGTCAAATAAACCCCAAGGACGACACACAGT	3840
Qy	3841	ATGGATCACATATTGTTTGACATTAAGCTTTTGCCAGAAAATGTTGCATGTGTTTTACCT	3900
Db	3841	ATGGATCACATATTGTTTGACATTAAGCTTTTGCCAGAAAATGTTGCATGTGTTTTACCT	3900
Qy	3901	CGACTTGCTAAAATCGATTAGCAGAAAGGCATGGCTAATAATGTTGGTGGTGAAAATAAA	3960
Db	3901	CGACTTGCTAAAATCGATTAGCAGAAAGGCATGGCTAATAATGTTGGTGGTGAAAATAAA	3960
Qy	3961	TAAATAAGTAAACAAAATGAAGATTGCCTGCTCTCTGTGCTAGCCTCAAAGCGTTCA	4020
Db	3961	TAAATAAGTAAACAAAATGAAGATTGCCTGCTCTCTGTGCTAGCCTCAAAGCGTTCA	4020
Qy	4021	TCATACATCATACCTTTAAGATTGCTATATTTTGGGTTATTTTCTTGACAGGAGAAAAAG	4080
Db	4021	TCATACATCATACCTTTAAGATTGCTATATTTTGGGTTATTTTCTTGACAGGAGAAAAAG	4080
Qy	4081	ATCTAAAGATCTTTTATTTTCATCTTTTTTGGTTTTCTTGGCATGACTAAGAAGCTTAAA	4140
Db	4081	ATCTAAAGATCTTTTATTTTCATCTTTTTTGGTTTTCTTGGCATGACTAAGAAGCTTAAA	4140
Qy	4141	TGTTGATAAAAATATGACTAGTTTTGAATTTACACCAAGAACTTCTCAATAAAAGAAAATC	4200
Db	4141	TGTTGATAAAAATATGACTAGTTTTGAATTTACACCAAGAACTTCTCAATAAAAGAAAATC	4200
Qy	4201	ATGAATGCTCCACAATTTCAACATACCACAAGAGAAGTTAATTTCTTAACATTGTGTTCT	4260
Db	4201	ATGAATGCTCCACAATTTCAACATACCACAAGAGAAGTTAATTTCTTAACATTGTGTTCT	4260
Qy	4261	ATGATTATTTGTAAGACCTTCACCAAGTTCTGATATCTTTTAAAGACATAGTTCAAAATT	4320
Db	4261	ATGATTATTTGTAAGACCTTCACCAAGTTCTGATATCTTTTAAAGACATAGTTCAAAATT	4320
Qy	4321	GCTTTTGAAAATCTGTATTCTTGAAAATATCCTTGTTGTGTATTAGGTTTTTAAATACCA	4380
Db	4321	GCTTTTGAAAATCTGTATTCTTGAAAATATCCTTGTTGTGTATTAGGTTTTTAAATACCA	4380

Qy 4381 GCTAAAGGATTACCTCACTGAGTCATCAGTACCCTCCTATTTCAGCTCCCCAAGATGATGT 4440
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4381 GCTAAAGGATTACCTCACTGAGTCATCAGTACCCTCCTATTTCAGCTCCCCAAGATGATGT 4440
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4441 GTTTTGTGCTTACCCTAAGAGAGGTTTTCTTCTTATTTTTAGATAATTCAAGTGCTTAGAT 4500
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4441 GTTTTGTGCTTACCCTAAGAGAGGTTTTCTTCTTATTTTTAGATAATTCAAGTGCTTAGAT 4500
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4501 AAATTATGTTTTCTTTAAGTGTTTATGGTAAACTCTTTTAAAGAAAATTTAATATGTTAT 4560
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4501 AAATTATGTTTTCTTTAAGTGTTTATGGTAAACTCTTTTAAAGAAAATTTAATATGTTAT 4560
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4561 AGCTGAATCTTTTTGGTAACTTTAAATCTTTATCATAGACTCTGTACATATGTTCAAATT 4620
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4561 AGCTGAATCTTTTTGGTAACTTTAAATCTTTATCATAGACTCTGTACATATGTTCAAATT 4620
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4621 AGCTGCTTGCCTGATGTGTGTATCATCGGTGGGATGACAGAACAAACATATTTATGATCA 4680
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4621 AGCTGCTTGCCTGATGTGTGTATCATCGGTGGGATGACAGAACAAACATATTTATGATCA 4680
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4681 TGAATAATGTGCTTTGTAAAAAGATTTCAAGTTATTAGGAAGCATACTCTGTTTTTTAAT 4740
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4681 TGAATAATGTGCTTTGTAAAAAGATTTCAAGTTATTAGGAAGCATACTCTGTTTTTTAAT 4740
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4741 CATGTATAATATTCATGATACTTTTATAGAACAATTCTGGCTTCAGGAAAGTCTAGAAG 4800
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Db 4741 CATGTATAATATTCATGATACTTTTATAGAACAATTCTGGCTTCAGGAAAGTCTAGAAG 4800
 ||||||||||||||||||||||||||||||||||||||||||||||||||||||||
 Qy 4801 CAATATTTCTTCAAATAAAAAGGTGTTTAAACTTT 4834
 ||||||||||||||||||||||||||||||||||||
 Db 4801 CAATATTTCTTCAAATAAAAAGGTGTTTAAACTTT 4834
 ||||||||||||||||||||||||||||||||||||